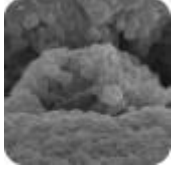


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What is yeast?

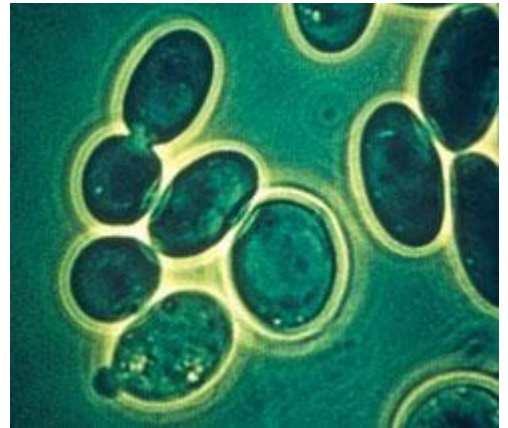
Yeast is an ovoid or spherical unicellular microscopic **fungus**. The particularity of yeast is that it is a **living organism**!

Like those found in humans, yeast **cells** are living and natural. They need air to multiply, but the absence of air also has consequences on their development.



A living organism

Although it looks inert, this block of yeast consists of a multitude of living organisms, scientifically called "**micro-organisms**". The yeast cell is egg-shaped and is not visible to the naked eye. Its size in fact does not exceed 6 to 8 thousandths of a millimetre, barely bigger than a pinhead! A 1 cm cube weighs around 1g and it alone contains more than 10 billion living yeast cells!



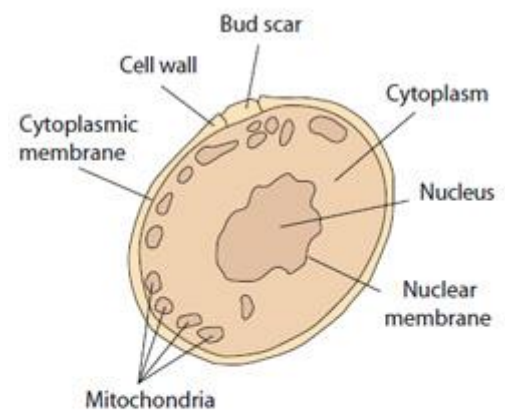
There are several yeast species. The most well-known is ***Saccharomyces cerevisiae***. However, there are many other types of yeast. Etymologically, "saccharo" comes from sugar, "Myces" from fungus and "cerevisiae" means "brewery" in latin. More commonly *saccharomyces cerevisiae* are called "brewer's yeasts" and "baker's yeasts" but they may also be called "budding yeast" after their means of reproduction. Yeast often conjures up the **world of baking** in people's minds. However, by selecting strains and developing multiplication techniques, yeast finds **many other applications** in such varied activities as food processing, flavoring, pharmaceuticals, animal health, etc.

The composition of a yeast cell

This wall consists of:

- an outer layer of mannoprotein, associated with glucanes
- an inner layer of glucanes associated with chitin
- a cytoplasmic membrane with high protein complex content.

Yeasts are **eukaryotic organisms**. The cell nucleus contains 16 linear **chromosomes**.



The development of yeast

Without air

When there is no air, sugar is mainly transformed into alcohol, to the detriment of the energy released. This happens in the case of bread-making. The yeast cannot find any more oxygen. **The sugar provided by the flour is transformed into alcohol** (this evaporates during baking) **and carbon dioxide**, proving the metabolic process of **fermentation**. In baking, **this production of carbon dioxide causes the dough to rise**. Here again, energy is released, but in low quantity enough to live but not to multiply. SUGAR --> CO₂ + ALCOHOL + LOW ENERGY

Diagram of a yeast cell
(diameter = 8 microns)



With air

In the presence of air, yeasts breathe and multiply abundantly, without forming alcohol. The sugar they feed off is transformed into carbon dioxide and water. This phenomenon is accompanied by **tremendous release of energy** to allow them to grow and multiply by budding. When the two cells have reached the same size, they separate and cell budding continues. This metabolic process is called respiration. It is used by yeast manufacturers to **multiply the cells**.

SUGAR + OXYGEN --> CO₂ + WATER + HIGH ENERGY



The history of yeast...

The use of yeast is not recent!

Without knowing its role or its existence, men have always used yeast.



Its history goes back 5,000 years...

Humans have always used yeast, well before writing was invented. Egyptians used it to make bread some **five thousand years** ago. However, they ignored the yeast **fermentation** process and they believed this chemical reaction to be a miracle.

Before that they had been content with preparations made with cereals, gruel or flat breads as basic components of their daily diet.

Bread was born the day that man realised that, with naturally fermented dough, bread could rise and its flavour and texture improved.

In the first century AD, it is said that the first bread was made in Gaul and Iberia using beer foam, i.e. the head formed on the top of the beverage during its fermentation. This method helped to speed up fermentation and improve the taste of bread and the way it rose.



Thanks Pasteur!

The history of yeast takes us back to 1680: using a microscope, Leeuwenhoek observed beer yeast globules for the first time. But it was not until **1857** and the work of French scientist, **Pasteur**, that the fermentation process was understood. Pasteur believed that the agents responsible for fermentation were yeasts. **He established the key role of yeast as the micro-organism responsible for alcoholic fermentation.**

He unveiled these mysteries by proving that the yeast **cell** can live with or without oxygen. Pasteur understood very early on that yeast was indispensable for forming bread's aromas and flavours.

Baker's yeast, *Saccharomyces cerevisiae*, has imposed itself, throughout history and worldwide, as the best way to make dough rise.